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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,155	08/18/2003	Gregory Steele	021245-001200US	3553

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TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

TRAN, KHANH C

ART UNIT PAPER NUMBER

2631

DATE MAILED: 01/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,155	STEELE ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-13 and 27-32 is/are allowed.
- 6) ☒ Claim(s) 14 and 16-19 is/are rejected.
- 7) ☒ Claim(s) 20-26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Amendment filed on 11/03/2005 has been entered. Claims 1-14 and 16-32 are pending in this Office action.

Response to Arguments

2. Applicant's arguments with respect to claims 1-14 and 16-26 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 27 is objected to because of the following informalities: in line 5, "SbS MDR" should be changed to -- symbol by symbol minimum distance receiver (SbS MDR) --. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 14, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rooyen US 2004/0234012 in view of Ketchum et al. U.S. Patent 6,760,388 B2 and admitted prior art.

Regarding claim 14, referring to figure 2, in paragraph [0053] and [0054], Rooyen discusses a conventional-temporal (ST) filtering receiver 200 including a first linear equalizer 206 and a second linear equalizer 208. Outputs of each of the first and second linear equalizers 206, 208 are coupled to a combiner 210, and an output of the combiner 201 is coupled to an MLSE/DFE portion 212. Rooyen further discusses optimum space-time (ST) equalizers, either in the sense of a minimum mean square error (MMSE) or maximum signal-to-interference-plus-noise ratio (SINR), typically include a whitening filter that whitens the CCI both spatially and temporally, and the filtering arrangement of FIG. 2 is typical of such systems.

Rooyen does not discuss the whitening filter is a whitened matched filter as set forth in the application claim.

Ketchum et al. invention is directed to techniques for processing data transmission at the transmitter and receiver of a MIMO system. In column 18 lines 35-45, Ketchum et al. teaches whitened matched filter 412 in the equivalent channel model is provided to simplify the derivation of the MMSE-LE. In a practical implementation, the response of the whitened matched filter is (automatically) incorporated within the response of the MMSE-LE when the MMSE-LE is adapted to minimize the mean square error.

Rooyen and Ketchum et al. teachings are in the same field of endeavor. Because optimum space-time (ST) equalizers, either in the sense of a minimum mean square error (MMSE) or maximum signal-to-interference-plus-noise ratio (SINR), typically include a whitening filter, one of ordinary skill in the art at the time the invention was made would have been motivated to modify the conventional-temporal (ST) filtering receiver 200 as discussed in Rooyen can be modified to include a whitened matched filter as taught in Ketchum et al. invention.

Rooyen and Ketchum do not teach a SbS MDR as set forth in the claimed invention. Nevertheless, admitted prior art in paragraph [0012], the SbS MDR can operate on a symbol to compensate for ICI. Because the SbS MDR can operate on a symbol to compensate for ICI, one of ordinary skill in the art at the time the invention was made would have been motivated to modify the conventional-temporal (ST) filtering receiver 200 as discussed above to implement the SbS MDR receiver as taught by admitted prior art.

Regarding claim 16, referring to figure 2 in Rooyen invention, joint space-time received signal (output from the whitened matched filter) is different than the one of more input signals.

5. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rooyen US 2004/0234012, Ketchum et al. U.S. Patent 6,760,388 B2 and admitted prior art as applied to claim 14 above and further in view of Ghosh U.S. 2003/0152176 A1.

Regarding claim 17, claim 17 is rejected on the same ground as for claim 14 because of similar scope.

Rooyen and Ketchum do not teach a Barker demodulator as set forth in the claimed invention.

Figure 3 of Ghosh invention illustrates a joint DFE and CCK decoding structure. In paragraph [0023], in accordance with the configuration illustrated in figure 3, the CCK decoder/Barker despreader device 25' is embedded into a DFE feedback loop 30 including the feedback filter. In light of the foregoing disclosure, the received signals are Barker modulated signals and complementary code keying (CCK) signals. The CCK decoder/Barker despreader device 25' includes Barker correlators.

Ghosh does not teach a plurality of antenna, however, teach method for joint processing a combined received signal. Rooyen discusses an optimum receiver for joint space-time processing. Rooyen further teaches the received signal can be a complementary code keying (CCK) signal; see column 11 claim 45 of Rooyen invention. Because Ghosh teaches an enhanced method and apparatus for performing feedback equalization and complementary code key (CCK) decoding, one of ordinary skill in the art at the time the invention was made would have been motivated to modify the conventional-temporal (ST) filtering receiver 200 as discussed above to implement Ghosh teachings.

Regarding claim 18, as recited in claim 17, figure 3 further shows CCK decoder/Barker despreaders device 25' is embedded into a DFE feedback loop 30. The CCK decoder corresponds to the claimed complimentary code keying demodulator.

Regarding claim 19, as recited in claim 17, figure 3 further shows CCK decoder/Barker despreaders device 25' is embedded into a DFE feedback loop 30, which inherently includes a decision feedback equalizer.

Allowable Subject Matter

6. Claims 1-13 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 1, claim is allowed over prior art of record since the cited references taken individually or in combination fails to disclose a wireless receiver for receiving data over wireless channel comprising "a demodulation logic in the digital signal processing logic that demodulates a set of signals from two or more of the plurality of antennas as set forth in the application claim" and "a distortion compensation in the digital signal processing logic as set forth in the application claim".

7. Claims 20-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claim 27 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 27, claim is allowed over prior art of record since the cited references taken individually or in combination fails to disclose a wireless receiver for receiving data over wireless channel comprising "a first combined filter as set forth in the application claim" and "a second combined filter as set forth in the application claim".

9. Claims 28-30 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 28, claim is allowed over prior art of record since the cited references taken individually or in combination fails to disclose a wireless receiver for receiving data over wireless channel comprising "a first combined filter as set forth in the application claim" and "a second combined filter as set forth in the application claim".

10. Claims 31-32 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 31, claim is allowed over prior art of record since the cited references taken individually or in combination fails to disclose a wireless receiver for receiving data over wireless channel comprising "a first combined filter as set forth in the application claim" and "a second combined filter as set forth in the application claim".

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Schmidt et al. U.S. Patent Application Publication 2003/0161421 discloses "Interference Reduction In CCK Modulated Signals".

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KCT

Phan Cong Tran

01/20/2006

Examiner KHANH

TRAN